

## CLAIMS

## I CLAIM:

## 1. A valve assembly, comprising:

a valve body having at least a fluid inlet and a fluid outlet, at least one of the valve body fluid inlet and fluid outlet defining a cross sectional flow area;

a plug disposed within the valve body, the plug having at least an outer surface and a flow passage extending therethrough, the plug selectively moveable between (i) an open position, in which the flow passage is in fluid communication with the valve body fluid inlet and fluid outlet, and (ii) a closed position, in which the flow passage is not in fluid communication with the valve body fluid inlet and fluid outlet; and

a segment seal assembly coupled to the plug, the segment seal assembly including:

a main body having a first side, a second side, and an opening extending therebetween, the segment seal first side disposed proximate the plug outer surface,

a seal gland formed in the main body first side and surrounding the main body opening,

a seal disposed within the seal gland and in contact with the plug outer surface, whereby a sealed vent region is formed between the main body first side and the plug outer surface,

wherein the sealed vent region has a cross sectional area that is substantially equal to or less than the defined cross sectional flow area.

## 2. The valve assembly of Claim 1, further comprising:

a backup ring disposed at least partially within the seal gland and coupled to the seal.

3. The valve assembly of Claim 1, further comprising:  
a spring disposed within at least a portion of the sealed vent region, the spring configured to bias the segment seal main body away from the plug outer surface.
4. The valve assembly of Claim 1, further comprising:  
an actuator assembly mounted on the valve body and coupled to the plug, the actuator adapted to receive one or more control signals and operable, in response thereto, to move the plug between the open and closed positions.
5. The valve assembly of Claim 1, further comprising:  
one or more bearing assemblies mounted within the valve body and coupled to the plug, to thereby rotationally mount the plug therein.
6. The valve assembly of Claim 1, further comprising:  
a plurality of engagement sections extending substantially perpendicularly away from the plug outer surface, each engagement section engaging a portion of the segment seal main body.
7. The valve assembly of Claim 6, wherein:  
the engagement sections form a recess; and  
at least a portion of the segment seal main body is disposed within the recess.
8. The valve assembly of Claim 1, wherein the seal is configured to bias the segment seal main body away from the plug outer surface.
9. The valve assembly of Claim 1, wherein the segment seal main body opening is in fluid communication with the valve body inlet when the plug is in the closed position.

10. The valve assembly of Claim 1, wherein the segment seal main body opening is in fluid communication with the valve body outlet when the plug is in the closed position.

11. A valve for mounting within a valve body having at least an inlet, and an outlet, and wherein at least one of the valve body inlet and outlet define a cross sectional flow area, the valve comprising:

a plug adapted to be mounted within the valve body, the valve plug having at least an outer surface and a flow passage extending therethrough, the plug selectively moveable between (i) an open position, in which the flow passage is in fluid communication with the valve body inlet and outlet, and (ii) a closed position, in which the flow passage is not in fluid communication with the valve body inlet and outlet; and

a segment seal coupled to the plug, the segment seal including:

a main body having a first side, a second side, and an opening extending therebetween, the segment seal first side disposed proximate the plug outer surface,

a seal gland formed in the segment seal first side and surrounding the segment seal opening, and

a seal disposed within the seal gland and in contact with the plug outer surface, whereby a sealed vent region is formed between the segment seal first side and the plug outer surface,

wherein the sealed vent region has a cross sectional area that is substantially equal to or less than the defined cross sectional flow area.

12. The valve of Claim 11, further comprising:

a backup ring disposed at least partially within the seal gland and coupled to the seal.

13. The valve of Claim 11, further comprising:

a spring disposed within at least a portion of the sealed vent region, the spring configured to bias the segment seal main body away from the plug outer surface.

14. The valve of Claim 11, further comprising:  
a plurality of engagement sections extending substantially perpendicularly away from the plug outer surface, each engagement section engaging a portion of the segment seal main body.

15. The valve of Claim 14, wherein:  
the engagement sections form a recess; and  
at least a portion of the segment seal main body is disposed within the recess.

16. The valve of Claim 11, wherein the seal is configured to bias the segment seal main body away from the plug outer surface.

17. A valve assembly, comprising:

a valve body having an inlet, and an outlet, at least one of the valve body inlet and outlet defining a cross sectional flow area;

a plug disposed within the valve body, the plug having at least an outer surface and a flow passage extending therethrough, the plug selectively moveable between (i) an open position, in which the flow passage is in fluid communication with the valve body inlet and outlet, and (ii) a closed position, in which the flow passage is not in fluid communication with the valve body inlet and outlet;

one or more bearing assemblies mounted within the valve body and coupled to the plug, to thereby rotationally mount the plug therein;

an actuator assembly mounted on the valve body and coupled to the plug, the actuator adapted to receive one or more control signals and operable, in response thereto, to move the plug between the open and closed positions; and

a segment seal assembly coupled to the plug, the segment seal assembly including:

a main body having a first side, a second side, and an opening extending therebetween, the segment seal first side disposed proximate the plug outer surface,

a seal gland formed in the main body first side and surrounding the main body opening,

a seal disposed within the seal gland and in contact with the plug outer surface, whereby a sealed vent region is formed between the main body first side and the plug outer surface,

wherein the sealed vent region has a cross sectional area that is substantially equal to or less than the defined cross sectional flow area.

18. The valve assembly of Claim 1, further comprising:

a spring disposed within at least a portion of the sealed vent region, the spring configured to bias the segment seal main body away from the plug outer surface.

19. The valve assembly of Claim 1, further comprising:  
a plurality of engagement sections extending substantially perpendicularly away from the plug outer surface, each engagement section engaging a portion of the segment seal main body.

20. The valve assembly of Claim 6, wherein:  
the engagement sections form a recess; and  
at least a portion of the segment seal main body is disposed within the recess.